Family list
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1 **FORMING METHOD FOR FILM PATTERN, FILM PATTERN FORMING DEVICE, CONDUCTIVE FILM WIRING METHOD, MOUNT STRUCTURE OF SEMICONDUCTOR CHIP, SEMICONDUCTOR APPARATUS, LIGHT EMISSION DEVICE, ELECTRONIC OPTICAL APPARATUS, ELECTRONIC APPARATUS, AND NON-CONTACT CARD MEDIUM**

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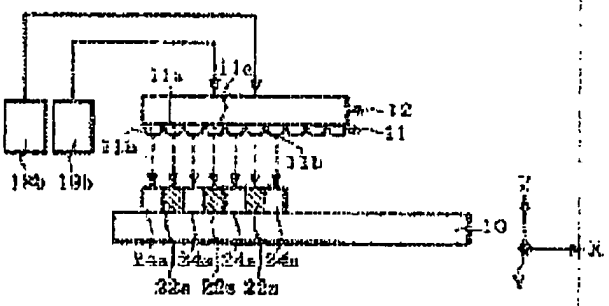
Abstract of **JP 2003318133 (A)**

PROBLEM TO BE SOLVED: To provide a forming method for a film pattern, a film pattern forming device, a conductive film wiring method, the mount structure of a semiconductor chip, a semiconductor apparatus, a light emission device, an electronic optical apparatus, an electronic apparatus, and a non-contact card medium, which are capable of forming high precise film pattern with a simple process. ; SOLUTION: The forming method for the film pattern forms the film pattern with a droplet discharging method discharging a droplet consisting of a liquid substance including a film forming component to a prescribed film forming area on a substrate. A plurality of film patterns are formed at adjacent positions by discharging a plurality of droplets mutually free from mixture. ; COPYRIGHT: (C)2004,JPO



JP, 2003-318133, and A [FULL CONTENTS]

Notes:
1. Untranslatable words are replaced with asterisks (****).
2. Texts in the figures are not translated and shown as it is.

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FULL CONTENTS

[Claim(s)]
[Claim 1][by carrying out discharge of two or more drops which are the formation methods of a film pattern which breathes out a drop which consists of a liquefied thing containing a film formation ingredient to a predetermined film formation field on a substrate, and forms a film pattern with a droplet discharging method, and are not mixed mutually] A formation method of a film pattern containing what two or more film patterns formed in an adjacent position for.
[Claim 2]A formation method of a film pattern which has a function in which said two or more film patterns formed in said adjacent position differ mutually in Claim 1.
[Claim 3]A formation method of a film pattern which forms said two or more film patterns by carrying out discharge of said two or more drops to a position adjacent in the direction parallel to said substrate in Claim 1 or 2 so that each other may be adjoined in the direction parallel to said substrate.
[Claim 4]A formation method of a film pattern which forms said two or more film patterns in Claim 1 or 2 by carrying out discharge of said two or more drops to the same position in piles mostly so that said substrate and a perpendicular direction may be adjoined.
[Claim 5]A formation method of a film pattern in which the boiling point is lower than a liquefied thing which constitutes a drop by which a liquefied thing which constitutes a drop of one among said two or more drops in Claim 4 was formed above said drop of 1.
[Claim 6]A formation method of a film pattern which forms said two or more film patterns in this crevice by carrying out discharge to a crevice in which said two or more drops were provided by said substrate in Claim 4 or 5.
[Claim 7]A formation method of a film pattern which includes promoting separation of a drop of this plurality by adding centrifugal force to a drop of this plurality in Claim 6 after breathing out said two or more drops to said crevice.
[Claim 8]A formation method of a film pattern said whose 1st drop said two or more drops consist of the 1st drop and 2nd drop, and is a liquefied thing which contains a conductive particulate as said film formation ingredient in either of the Claims 1-7 and in which said 2nd drop is a liquefied thing which contains an insulator as said film formation ingredient.
[Claim 9]A formation method of a film pattern which forms an electric conduction film from said 1st drop, and forms an insulating film from said 2nd drop in Claim 8.
[Claim 10]A formation method of a film pattern which forms said electric conduction film in Claim 9 by performing heat treatment and/or light irradiation to said 1st drop.

[Claim 11]In either of the Claims 1-10, a lyophilic pattern and a liquid repellence pattern are further formed in a predetermined field of said substrate, A formation method of a film pattern which forms said two or more film patterns on this lyophilic pattern by carrying out discharge of an implication and said two or more drops to a field to which it was given to said lyophilic pattern and said liquid repellence pattern.
[Claim 12]A formation method of a film pattern which forms an interface of two or more of said film patterns by removing simultaneously a liquefied thing contained in said two or more drops, respectively by evaporation and/or decomposition in either of the Claims 1-11 without putting to the atmosphere.
[Claim 13][a drop which consists of a liquefied thing containing a film formation ingredient with a droplet discharging method] A forming device of a film pattern which is a forming device of a film pattern which breathes out to a predetermined film formation field on a substrate, and forms a film pattern, and forms a film pattern with a formation method of the film pattern according to any one of claims 1 to 12.
[Claim 14]A forming device of a film pattern which contains a head of 1 which can carry out discharge of said two or more drops in Claim 13.
[Claim 15]A forming device of a film pattern in which a head for exclusive use is installed in Claim 13 for every drop which constitutes said two or more drops.
[Claim 16]A forming device of a film pattern which carries out discharge after mixing a drop of this plurality by this mixing means in Claim 13 including a mixing means which mixes said two or more drops.
[Claim 17]Electric conduction film wiring formed by a formation method of the film pattern according to any one of claims 8 to 10.
[Claim 18]Mounting structure of a semiconductor chip including the electric conduction film wiring according to claim 17.
[Claim 19]An electrooptics device including the electric conduction film wiring according to claim 17.
[Claim 20]A semiconductor device with which said electrode and said insulating layer are formed through a formation method of the film pattern according to claim 1 including an insulating layer which insulates said electrode of each other with a source electrode, a drain electrode, and a gate electrode.
[Claim 21]A luminescent device with which said luminous layer and said electron hole transportation / pouring layer are formed through a formation method of the film pattern according to any one of claims 1 to 7 including a luminous layer and electron hole transportation / pouring layer, and a pair of electrode layers that pinch this luminous layer and this electron hole transportation / pouring layer.
[Claim 22]Electronic equipment containing the electrooptics device according to claim 19.
[Claim 23]Electronic equipment containing the semiconductor device according to claim 20.
[Claim 24]Electronic equipment containing the luminescent device according to claim 21.
[Claim 25]A noncontact card medium which includes the electric conduction film wiring according to claim 17 as an antenna circuit.

[Detailed Description of the Invention]
[0001]
[Field of the Invention]This invention relates to the formation method and film pattern formation devices of a film pattern, such as an insulating film which protects the electric conduction film wiring

used for wiring of an electrode, an antenna, an electronic circuit, an integrated circuit, etc., and this electric conduction film wiring.
[0002]This invention relates to the formation method and film pattern formation device of a film pattern for forming each layer which constitutes an electrooptics device.
[0003]This invention relates to the mounting structure, the semiconductor device, the luminescent device, the electrooptics device, the electronic equipment, and the noncontact card medium of a semiconductor chip.
[0004]
[Background of the Invention]By the ink-jet method, a predetermined material is breathed out on a substrate, and the method of forming in a predetermined pattern the wiring included in various kinds of electrooptics devices and a layer is developed. For example, in the U.S. Pat. No. 5132248 item, the pattern application of the liquefied thing which distributed the conductive particulate is directly carried out by the ink-jet method at a substrate, and the method of performing the stress relief heat treatment and laser radiation, and changing into an electric conduction film pattern is proposed. According to this method, while the process of wiring formation will become sharply easy, there is a merit that there is also little amount of the raw material used, and it ends.
[0005]By the way, in connection with the miniaturization of an element in recent years, the wiring and the insulating layer which are contained in various kinds of electrooptics devices are miniaturized. Especially, a possibility that adjoining wiring will contact and short-circuit becomes large as the wiring used for an electronic circuit, or an electrode and an integrated circuit is miniaturized. Therefore, it becomes important by patterning wiring with sufficient accuracy to secure the insulation during wiring.
[0006]On the other hand, when forming a luminescent device, for example, an organic electroluminescence device, two or more layers (for example, a luminous layer, electron hole transportation / pouring layer, etc.) which constitute an organic electroluminescence device can be formed by the ink-jet method. In this case, generally several different materials are applied in order. When this organic electroluminescence device drives, an electric charge (an electron hole or an electron) moves among said two or more layers which constitute an organic electroluminescence device. In order to obtain an efficient organic electroluminescence device, it is important to improve the mobility of the electric charge between these layers. The mobility of an electric charge can be improved by forming the interface of these layers homogeneously.
[0007]
[Problem to be solved by the invention]The purpose of this invention is to provide the formation method and film pattern formation device of a highly precise film pattern by a simple method that it can form.
[0008]The purpose of this invention is related with the luminescent device and semiconductor device which were formed by the formation method of the formation method of the film pattern for forming each layer which constitutes a luminescent device or a semiconductor device, the film pattern formation device, and this film pattern.
[0009]This invention relates to the mounting structure, the electrooptics device, the electronic equipment, and the noncontact card medium of a semiconductor chip including the electric conduction film wiring formed by the formation method of said film pattern, and this conductive wiring.
[0010]
[Means for solving problem](Formation method of a film pattern), [the formation method of the film pattern of this invention] [by carrying out discharge of two or more drops which are the formation

methods of the film pattern which breathes out the drop which consists of a liquefied thing containing a film formation ingredient to the predetermined film formation field on a substrate, and forms a film pattern with a droplet discharging method, and are not mixed mutually] What two or more film patterns are formed in an adjacent position for is included.

[0011]According to the formation method of the film pattern of this invention, two or more film patterns can be formed in an adjacent position by a simple method with sufficient accuracy. In detail, the column of this embodiment explains.

[0012]The formation method of the film pattern of this invention can take the mode of (1) - (6).

[0013](1) Said two or more film patterns formed in said adjacent position can have a mutually different function. Since several film patterns in which functions differ mutually can be formed simultaneously according to this method, the increase in efficiency of the process of a manufacturing process can be attained. Said two or more patterns can be formed in desired shape, respectively.

[0014](2) By carrying out discharge of said two or more drops to a position adjacent in the direction parallel to said substrate, said two or more film patterns can be formed so that each other may be adjoined in the direction parallel to said substrate.

[0015](3) By carrying out discharge of said two or more drops to the same position in piles mostly, said two or more film patterns can be formed so that said substrate and a perpendicular direction may be adjoined.

[0016]In this case, the boiling point can make it lower than the liquefied thing which constitutes the drop formed above said drop of 1 in the liquefied thing which constitutes the drop of one among said two or more drops. According to this method, the liquefied thing which constitutes said drop of 1 can be removed more easily.

[0017]Said two or more film patterns can be formed in this crevice by carrying out discharge of said two or more drops to the crevice in which it was provided by said substrate in this case. Under the present circumstances, after breathing out said two or more drops to said crevice, it can include promoting separation of the drop of this plurality by adding centrifugal force to the drop of this plurality. According to this method, the drop of this plurality is separated easily and membraneous equalization can be attained in a short time.

[0018](4) Said two or more drops can consist of the 1st drop and 2nd drop, said 1st drop can be a liquefied thing which contains a conductive particulate as said film formation ingredient, and said 2nd drop can be a liquefied thing which contains an insulator as said film formation ingredient. According to this method, an insulating film can be formed with an electric conduction film. Since an electric conduction film can be formed by a brief method with sufficient accuracy, it is hard to produce defects, such as disconnection and a short circuit, and the electric conduction film wiring excellent in reliability can be obtained.

[0019]In this case, an electric conduction film can be formed from said 1st drop, and an insulating film can be formed from said 2nd drop. According to this method, since an insulating film can be formed with an electric conduction film, the increase in efficiency of the process of a manufacturing process can be attained.

[0020]Said electric conduction film can be formed by performing heat treatment and/or light irradiation to said 1st drop in this case. According to this method, the film formation ingredient contained in the 1st drop by a simple method can be solidified.

[0021](5) Said two or more film patterns can be formed on this lyophilic pattern by carrying out

discharge to the field to which said two or more drops were given to said lyophilic pattern and said liquid repellence pattern further including forming a lyophilic pattern and a liquid repellence pattern in the predetermined field of said substrate. Since it can form in the field of a request of the film pattern of this plurality alternatively by forming said lyophilic pattern in the field to form said two or more film patterns in according to this method, the film pattern of desired shape can be formed.

[0022]For example, when substrate treatment for applying said two or more drops to a desired field is performed beforehand, Make a substrate lyophilic by irradiating with UV, or, for example For example, the heptadeca fluoroes 1, 1, and 2 and 2 tetrahydro decyltriethoxysilane, Liquid repelling of the substrate is carried out using fluoro ARUKIRUSHIRAN (FAS) represented by the trideca fluoroes 1, 1, and 2, 2 tetrahydro octyl triethoxysilane, etc., Said lyophilic pattern and said liquid repellence pattern can be created by making only a desired position lyophilic by pattern irradiation of UV to this FAS. Thereby, a film pattern can be formed with sufficient accuracy.

[0023](6) An interface of two or more of said film patterns can be formed by removing simultaneously a liquefied thing contained in said two or more drops, respectively by evaporation and/or decomposition, without putting to the atmosphere. According to this method, since an interface of two or more of said film patterns can be formed in a good state, a function of a film pattern can be improved.

[0024](Forming device of a film pattern), [a forming device of a film pattern of this invention] It is a forming device of a film pattern which breathes out a drop which consists of a liquefied thing containing a film formation ingredient to a predetermined film formation field on a substrate, and forms a film pattern with a droplet discharging method, and a film pattern is formed with a formation method of the above-mentioned film pattern.

[0025]According to the forming device of a film pattern of this invention, two or more film patterns can be formed in an adjacent position often [accuracy] and simply.

[0026]The forming device of the above-mentioned film pattern can contain a head of 1 which can carry out discharge of said two or more drops. A head for exclusive use can be installed for every drop which constitutes said two or more drops. Including a mixing means which mixes said two or more drops, discharge can be carried out after mixing a drop of this plurality by this mixing means.